

Serial No. 10/768,076
OKI 620
Amendment dated January 23, 2006

Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claim 1 (Previously Presented): A remaining film thickness determining method employed in a polishing process, comprising:

- a measuring process including,
- a first step of forming a predetermined coated film on a semiconductor substrate;
- a second step of forming on the coated film resist patterns each having a plurality of pattern blocks including lines and spaces in which at least one of line widths and space widths are different from one another;
- a third step of etching a surface of the coated film and the semiconductor substrate with the resist patterns as masks to thereby form trenches;
- a fourth step of removing the resist patterns and thereafter forming a buried insulating film which charges interiors of the trenches and covers the surface of the coated film;
- a fifth step of polishing a surface of the buried insulating film so as to expose the surface of the coated film; and
- a sixth step of measuring remaining film thicknesses of the coated film

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subsequent to said fifth step, at a plurality of measuring points; and

a computing process including,

a seventh step of conceptually defining reference regions each having a predetermined shape and area in a surface of the semiconductor substrate, such that each of the measuring points is respectively placed in a center of a corresponding one of the reference regions;

an eighth step of computing for each of the reference regions a ratio between an area of a corresponding reference region and a gross area of the lines lying in the corresponding reference region;

a ninth step of determining a relationship between a result of measurement in said sixth step and a result of computation in said eighth step; and

a tenth step of determining an anticipated remaining film thickness of the coated film at an arbitrary point of an actually fabricated semiconductor device based on the relationship determined in said ninth step.

Claim 2 (Original): The remaining film thickness determining method according to claim 1, wherein the coated film is a laminated film having a protective oxide film formed on the semiconductor substrate and a silicon nitride film formed on the protective oxide film.

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Claim 3 (Previously Presented): The remaining film thickness determining method according to claim 1, wherein said fifth step is a chemical mechanical polishing process.

Claim 4 (Previously Presented): The remaining film thickness determining method according to claim 1, wherein the reference regions are defined so as to straddle the plurality of pattern blocks including the lines and the spaces.

Claim 5 (Previously Presented): The remaining film thickness determining method according to claim 1, wherein the gross area of the lines is calculated after the line widths are corrected so as to approximate convex pattern widths of the buried insulating film formed in said fourth step, and the computation of said eighth step is performed using a result of the calculation.

Claim 6 (Currently Amended): A remaining film thickness determining method employed in a polishing process, comprising:

a measuring process including,

forming a predetermined coated film on a semiconductor substrate;

forming on the coated film resist patterns each having a plurality of pattern blocks including lines and spaces in which at least one of line widths and space widths are different from one another;

etching a surface of the coated film and the semiconductor substrate with

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the resist patterns as masks to thereby form trenches;

removing the resist patterns and thereafter forming a buried insulating film which charges interiors of the trenches and covers the surface of the coated film;

polishing a surface of the buried insulating film so as to expose the surface of the coated film; and

measuring remaining film thicknesses of the coated film subsequent to said polishing, at a plurality of measuring points; and

a computing process including,

conceptually defining reference regions each having a predetermined shape and area in a surface of the semiconductor substrate, such that each of the measuring points is respectively placed in a center of a corresponding one of the reference regions;

computing for each of the reference regions a ratio between an area of a corresponding reference region and a gross area of the lines lying in the corresponding reference region;

determining a relationship between a result of measurement in said measuring remaining film thicknesses and a result of said ratio computing; and

determining an anticipated remaining film thickness of the coated film at an arbitrary point of an actually fabricated semiconductor device based on the relationship determined in said determining a relationship.

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Claim 7 (Original): The remaining film thickness determining method according to claim 6, wherein the coated film is a laminated film having a protective oxide film formed on the semiconductor substrate and a silicon nitride film formed on the protective oxide film.

Claim 8 (Previously Presented): The remaining film thickness determining method according to claim 6, wherein said polishing is a chemical mechanical polishing process.

Claim 9 (Previously Presented): The remaining film thickness determining method according to claim 6, wherein the reference regions are defined so as to straddle the plurality of pattern blocks including the lines and the spaces.

Claim 10 (Previously Presented): The remaining film thickness determining method according to claim 6, wherein the gross area of the lines is calculated after the line widths are corrected so as to approximate convex pattern widths of the buried insulating film formed in said removing the resist patterns, and said ratio computing is performed using a result of the calculation.